

### **REMARKS**

Claims 4-6 are pending in the application. In the Final Office Action dated September 24, 2009, claims 4-6 were rejected. Applicants filed an Amendment on March 15, 2010 ("the Amendment under Rule 116"), amending claim 4. The Advisory Action dated April 19, 2010 indicated that the proposed amendments to the claims included in the "the Amendment under Rule 116" were entered.

In the instant Amendment, claim 4 has been amended to recite that each of (i) a first side face upper frame member connected to the upper transverse frame member of the first side face wall frame member, (ii) a first side face upper frame member connected to the lower transverse frame member of the first side face wall frame member, (iii) a second side face upper frame member connected to the upper transverse frame member of the second side face wall frame member; (iv) a second side face lower frame member connected to the lower transverse frame member of the second side face wall frame member, (v) the vertical wall panel connected to the first and the second side face walls at an upper end thereof, and (vi) the wainscot wall panel connected to the first and the second side face walls at a lower end thereof, are connected by metal joints. Support for the amendment is found in the specification at, *e.g.*, p. 6, ll. 16-29; p. 10, l. 27 through p. 12, l. 14; p. 13, ll. 25-37; and Fig. 1. Accordingly, no new matter has been introduced.

Entry of the foregoing amendments and consideration of the following remarks are respectfully requested.

### **Rejections under 35 U.S.C. § 103(a)**

In the Final Office Action and the Advisory Action, claims 4-6 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 2,291,498 to Odell ("Odell") in view of U.S. Patent Application Publication No. 2003/0145537 to Bailey ("Bailey") and U.S. Patent No. 4, 869,040 to Howell ("Howell"), for the reasons set forth on pages 2-8 of the Final Office Action dated September 24, 2009.

The present invention provides a structure for a wall opening of a steel house able to suppress the breaking stress resulting, *e.g.*, from an earthquake, to a low level while maintaining the initial rigidity thereof at a high level. This is achieved by designing the wall opening structure such that the side face wall panel is integrated between the vertical wall panel and wainscot wall panel (*see, e.g.*, Figs. 1-3 of the present application). With such a

wall opening structure, as shown in Figs. 4 and 6 of the present application, the deformation behavior (*i.e.*, the relationship between the shear stress and the shear deformation) of the side face walls, results in the curve *u* of the present invention structure, which when compared with the curve *t* of a conventional structure, exhibits excellent energy absorption ability by suppressing local concentrations of stress in the steel house. *See*, the specification at, *e.g.*, p. 6, l. 11 through p. 7; l. 12; and p. 13, ll. 4-16. As defined in the application, a steel house is a house of iron skeletal frames and steel panels (*see*, the specification at p. 1, ll. 10-14).

In addition, Applicants have discovered that by providing metal joints as connectors between, *e.g.*, the vertical wall panel and the side face wall, and between the wainscot wall panel and the side face wall, when a horizontal force acts on the reinforcing structure, the metal joints elastically or plastically deform in the horizontal direction and effectively absorb the added energy. Therefore, when a horizontal shear force, such as an earthquake, is applied to the steel house, the entire reinforcing construction undergoes deformation in the horizontal direction, and the frames of the side face walls transform into a parallelogram shape as shown in Fig. 5 of the present application. The metal joints, joining each frame to which the vertical wall panel or the wainscot wall panel is attached with a pair of side face wall panels, move left and right (*i.e.*, horizontally) and are transformed while absorbing a large amount of energy, thereby reducing the stress applied to the side face wall. In other words, due to the metal joint connection between the vertical wall panel and/or the wainscot panel with the side face walls, the stress applied to the side face walls is reduced. Applicants have further discovered that as a result of the reduction of stress applied to the side walls, the section of the side face walls can be made smaller. *See*, the specification at, *e.g.*, p. 11, l. 16 through p. 12, l. 14; and p. 13, ll. 4-16.

In contrast, Odell teaches a method of covering inside walls and ceilings with wall board panels to give the appearance of a wall paper finish (Odell, p. 1, col. 1, ll. 1-4). Odell is not concerned with a steel house. Odell teaches that its wall board panels, which are preferably laminated or multi-ply paper board type, are nailed to the studding and headers of the wall or ceiling structures (Odell, p. 1, left col., ll. 5-14; and right col., ll. 22-28). A person skilled in the art would have understood that Odell's wall frame cannot be metal.

Nor is Odell concerned with the deformation behavior of a wall opening structure of a steel house, much less the claimed wall opening structure designed to suppress horizontal stress while maintaining high initial rigidity. For example, as discussed above, in the present

invention, the wall opening frame structure is such that the side face wall panel is integrated between the vertical wall panel and wainscot wall panel, allowing deformation of the side face wall panels in a manner as illustrated in Fig. 4 of the present application, which is contrary to that of the conventional structure as shown in Fig. 10 of the present application. Odell does not teach or suggest such a wall opening structure. According to the Final Office Action, the panel identified as “A” in the figure presented on page 7 of the Final Office Action corresponds to the side face wall panel. However, this panel is simply a piece of wall board panel which is made to fit the opening on a conventional frame (Odell, p. 2, right col., ll. 13-16). Odell does not teach or suggest that such a panel or its underlying frame structure has the function of deformation as the side face wall panel of the present invention. In addition, the panels identified at B and C in the Final Office Action as corresponding to the vertical wall panel and the wainscot wall panels are short, and not integrated with a part of the side face wall panel on the right side (Odell, Figs. 4 and 6). Furthermore, Odell does not teach or suggest connecting the frame members and panels using metal joints of the present invention. Thus, a person skilled in the art would have understood that the structure of Odell is a conventional rigid wood structure, and would not have been led by Odell to the present invention .

The Final Office Action admits on page 5 that Odell “does not disclose the upper and lower frame members (Applicant’s 154 and 157)” to which the metal joints of the present claim are connected, but asserts that Bailey discloses these features in “Fig. 15: 1 and approximate 19.” The Final Office Action contends that “Bailey discloses that it is known in the art to place such members in framing systems.” Applicant first respectfully point out that Bailey is also not concerned with a steel house as claimed in the present application. Bailey discloses a hybrid building using metal studs and brick ties in a timber framed building (Bailey, Abstract). In the structure depicted in Fig. 15 of Bailey, only the four studs 1 are metal. All other members, such as bottom and top plates 16 and 19, are timber (Bailey, paragraphs [0090], [0100] and [0101]).

Bailey is not concerned with the deformation behavior of a wall opening structure of a steel house, much less the claimed wall opening structure designed to suppress horizontal stress while maintaining high initial rigidity. For example, members 1 and 19 of Bailey are entirely different members from the upper and lower frame members of the present application. Member 1, according to Bailey, is a *vertical wall stud*, and member 19 is a

*horizontal top plate* sitting on top of the vertical wall stud (Bailey, paragraphs [0073], [0090], [0091], [0100]; and Fig. 15). Figure 15 of Bailey shows an arrangement of a pairs of studs 1 arranged face-to-face on both sides of a window. Top plate 19 is situated on top of, and is attached to, the pairs of studs 1. A comparison of the wall structure illustrated in Fig. 15 of Bailey to Fig. 10 of the present application demonstrates that Bailey discloses a conventional structure in which the side face wall panel is not integrated between the vertical wall panel and wainscot wall panel. A person skilled in the art would have understood that Bailey's structure would not allow the deformation of the side face walls as the presently claimed wall opening structure is designed to achieve under horizontal stresses.

Therefore, Odell in combination with Bailey does not teach or suggest the presently claimed invention.

Howell discloses a framing system for providing structural support to walls which includes a first metal channel with two parallel flanges having two or more longitudinal rows of longitudinally elongated slots, and is cited merely for disclosing a *steel* framing system (see, e.g., the Abstract of Howell). Nowhere, however, does Howell disclose the claimed wall opening structural features. The Office Action contends that it would have been obvious to a person skilled in the art to use steel framing over wood as taught by Odell. However, as discussed above, Odell is neither concerned with the deformation behavior of a wall opening structure of a steel house, nor discloses a wall opening structure having the claimed designed to suppress horizontal stress while maintaining high initial rigidity. Even if assuming, *arguendo*, that a person skilled in the art would have replaced Odell's wood frames and paper panels with steel frames and panels, he/she would not have arrived at the presently claimed invention. Therefore Howell does not cure the deficiencies of Odell and Bailey.

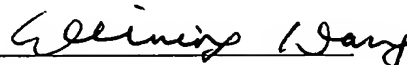
Furthermore, Odell is concerned with a method of covering inside walls and ceilings with wall board panels such as multi-ply paper boards by installing the board so that the vertical joints between boards are no more noticeable than the vertical joints between ordinary wall paper (Odell, p. 2, ll. 41-45). A person skilled in the art would not have expected that Odell can be practiced with steel frames and steel panels, since the steel panels cannot be attached to steel frames in the manner described by Odell. The modification would have therefore rendered Odell's method unsuitable for its own purpose.

Accordingly, the rejection of claim 4, and claims 5 and 6 which depend from claim 4, as obvious under 35 U.S.C. § 103(a) over Odell in view of Bailey and Howell cannot stand, and should be withdrawn.

Applicants thus submit that the entire application is now in condition for allowance, an early notice of which would be appreciated. Should the Examiner not agree with Applicants' position, a personal or telephonic interview is respectfully requested to discuss any remaining issues prior to the issuance of a further Office Action, and to expedite the allowance of the application.

Respectfully submitted,

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